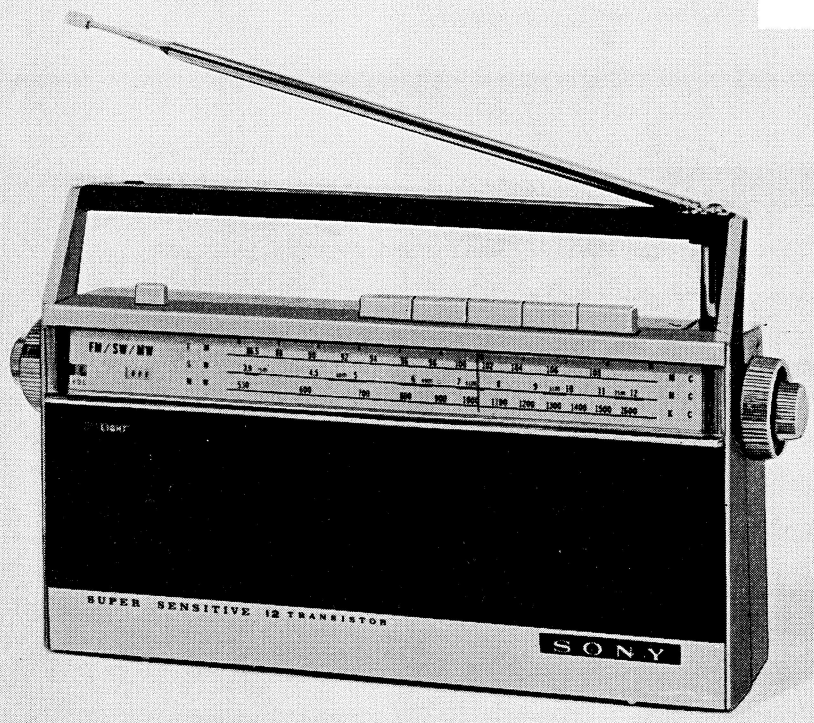
Serial No. 16,001 and After

TFM-117WB



Specifications

Circuit :	12 Transistor Superheterodyne
Frequency Coverage :	FM 86.5～108 Mc (3.47～2.78 m)
	SW 3.9～12 Mc (77～25 m)
	MW 530～1,605 Kc (566～187 m)
Intermediate Frequency :	FM 10.7 Mc, AM 455 Kc
Antenna System :	FM, SW Built-in Telescopic Antenna
	MW Built-in Ferrite Bar Antenna
Maximum Sensitivity : (at 10 mW output)	FM 3.5μV/m
	SW 3.5μV
	MW 20μV
Selectivity :	MW 28 dB at 10 Kc off resonance, at 1,400 Kc
Output Power :	500 mW (undistorted)
	800 mW (maximum)
Current Drain :	15 mA (AM), 20 mA (FM) at zero signal, 200 mA at 500 mW output
Speaker :	3×5″ (80×120 mm), PM dynamic, 8Ω
Power Source :	Four " C " Size Flashlight Batteries, (6 V in total), or House Current by using SONY AC Power Adapter
Dimensions :	6-5/8 (H) × 12 (W) × 2-3/8″ (D) (167×300×60 mm)
Weight :	3 lbs. 11 ozs. (1.7 Kgs.)

SONY®

SERVICING GUIDE

Removal of Chassis

(1) Remove the four Back Cover Holding Screws (+RK 3×8) and open the Back Cover gently.

(2) Remove the Battery Cylinder together with the four Batteries.

(3) Unsolder the white lead at the telescopic antenna terminal.

(4) Remove the Twin Jack and the Triple Jack from the Cabinet by pulling them out.

(5) Set the Volume Control to the position so that the cut portion of the Drum faces toward the bottom of the cabinet for easy removing of the screw (⑤ in Fig. 1).

(6) Remove the five Screws (① to ⑤ in Fig. 1) and take the Chassis out of the Cabinet gently taking care not to cut the leads.

Removal of AF Circuit Board

(1) Disconnect the Case Cover away from the AF Shield Case by unsoldering them.

(2) Take the AF Circuit Board out of the AF Shield Case gently.

Removal of IF Circuit Board

(1) Disconnect the Case Cover away from the IF Shield Case by unsoldering them.

(2) Remove the two IF Circuit Board Holding Screws.

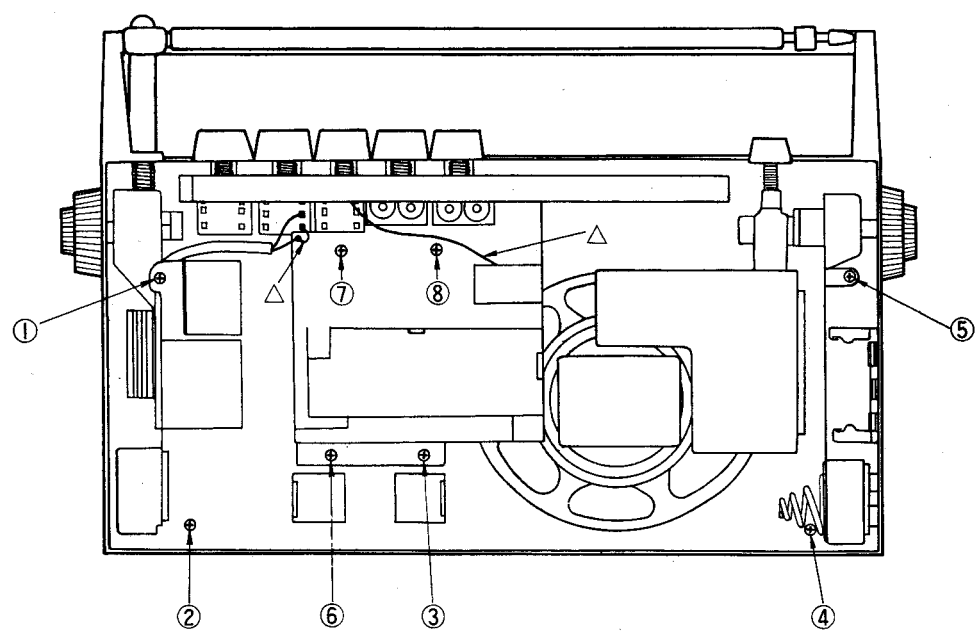
(3) Take the IF Circuit Board out of the IF Shield Case gently.

Removal of Coil Pack Circuit Board

(1) Remove the four Screws (⑤ to ⑧ in Fig. 1).

(2) Unsolder the two leads (marked with △ shown in Fig. 1) connected between the Coil Pack Circuit Board and the Key Switch.

(3) Remove the Coil Pack Circuit Board from the Chassis gently taking care not to cut the leads.



(Fig. 1)

Assembling the FM Tuner Block

In case of trouble in the Tuner Block, it is recommended to replace with new Block (Part No. of Tuner Block is Y-38226-05) without disengaging the FM Tuner Unit and the AM Tuning Capacitor.

If it is inevitable to disassemble the Tuner Block for servicing, assemble the FM Tuner Block referring to the following explanation.

(1) Fasten the AM Tuning Capacitor tentatively to the Bracket at the angle shown in Fig. 2-1 with the two Screws.

(2) Fix the Bracket to the FM Tuner Chassis with two Screws.

(3) Fasten the Drum Support tentatively to the FM Tuner Chassis with the two Screws. (Don't fix the screws too tightly.)

(4) Attach the Gear for the FM Tuner to the Shaft of the FM Tuning Capacitor at the angle shown in Fig. 3 while keeping the FM Tuning Capacitor fully turned clockwise.

(5) Attach the Double Gear to the Shaft of the AM Tuning Capacitor at the angle shown in Fig. 3 while keeping the AM Tuning Capacitor fully turned clockwise.

(6) Put the two gears of the Double Gear together by inserting a proper jig into an oval hole of the gear.

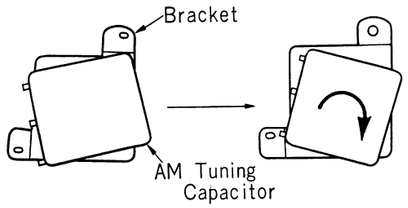
(7) Attach the Tuning Drum to the Shaft of the Drum Support and engage the Tuning Drum to the two Gears by moving it in the direction of arrow shown in Fig. 3.
(When engaging the Tuning Drum to their Gears, never revolve the Double Gear.)

(8) Fix the Drum Support to the FM Tuner Chassis with the two Screws fastened in preceding step (3).

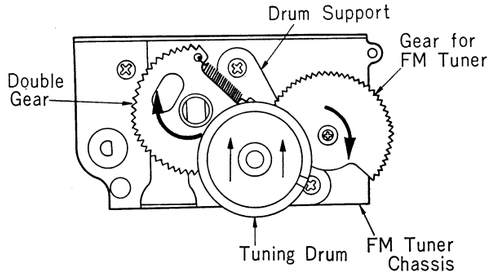
(9) Turn the Tuning Drum clockwise so that the two AM Tuning Capacitor Holding Screws are appeared in the oval holes of the Double Gear.

(10) Loosen the two AM Tuning Capacitor Holding Screws and turn the AM Tuning Capacitor to the angle shown in Fig. 2-2 taking care not to disengage the Double Gear from the Tuning Drum.

(11) Fix the AM Tuning Capacitor to the Bracket.



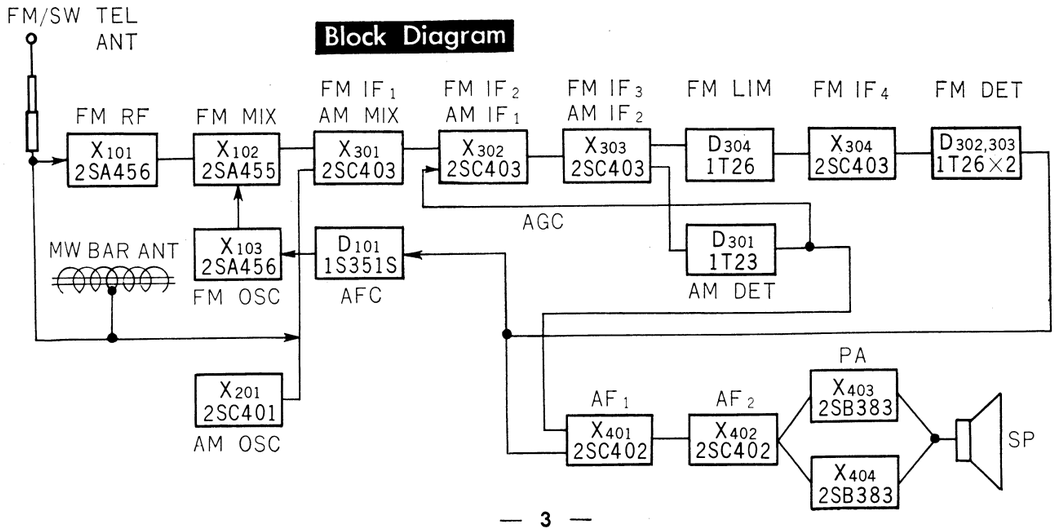
(Fig. 2-1)



(Fig. 2-2)

(Fig. 3)

Block Diagram

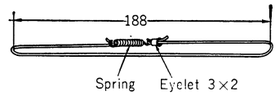


To String the Dial Cord

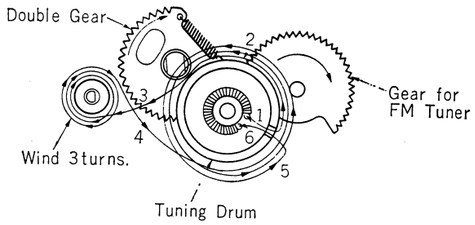
(1) Dial Cord for Tuning Capacitor

(a) Set the two Gears and the Tuning Drum at the position shown in Fig. 4-2 (AM Tuning Capacitor . . . minimum capacitance position).

(b) String the Dial Cord in the order of figures, ①, ②, ③ . . ., ⑥ as shown in Fig. 4-2.



(Fig. 4-1)

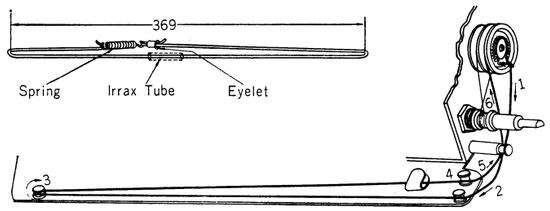


(Fig. 4-2)

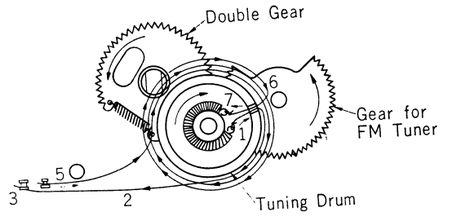
(2) Dial Cord for Pointer

(a) Set the two Gears and the Tuning Drum at the position shown in Fig. 5-2 (AM Tuning Capacitor . . . maximum capacitance position).

(b) String the Dial Cord in the order of figures, ①, ②, ③ . . ., ⑦ as shown in Fig. 5-2.



(Fig. 5-1)

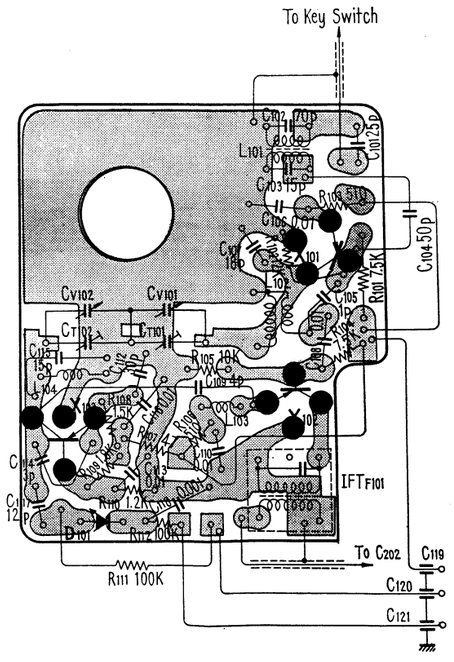


(Fig. 5-2)

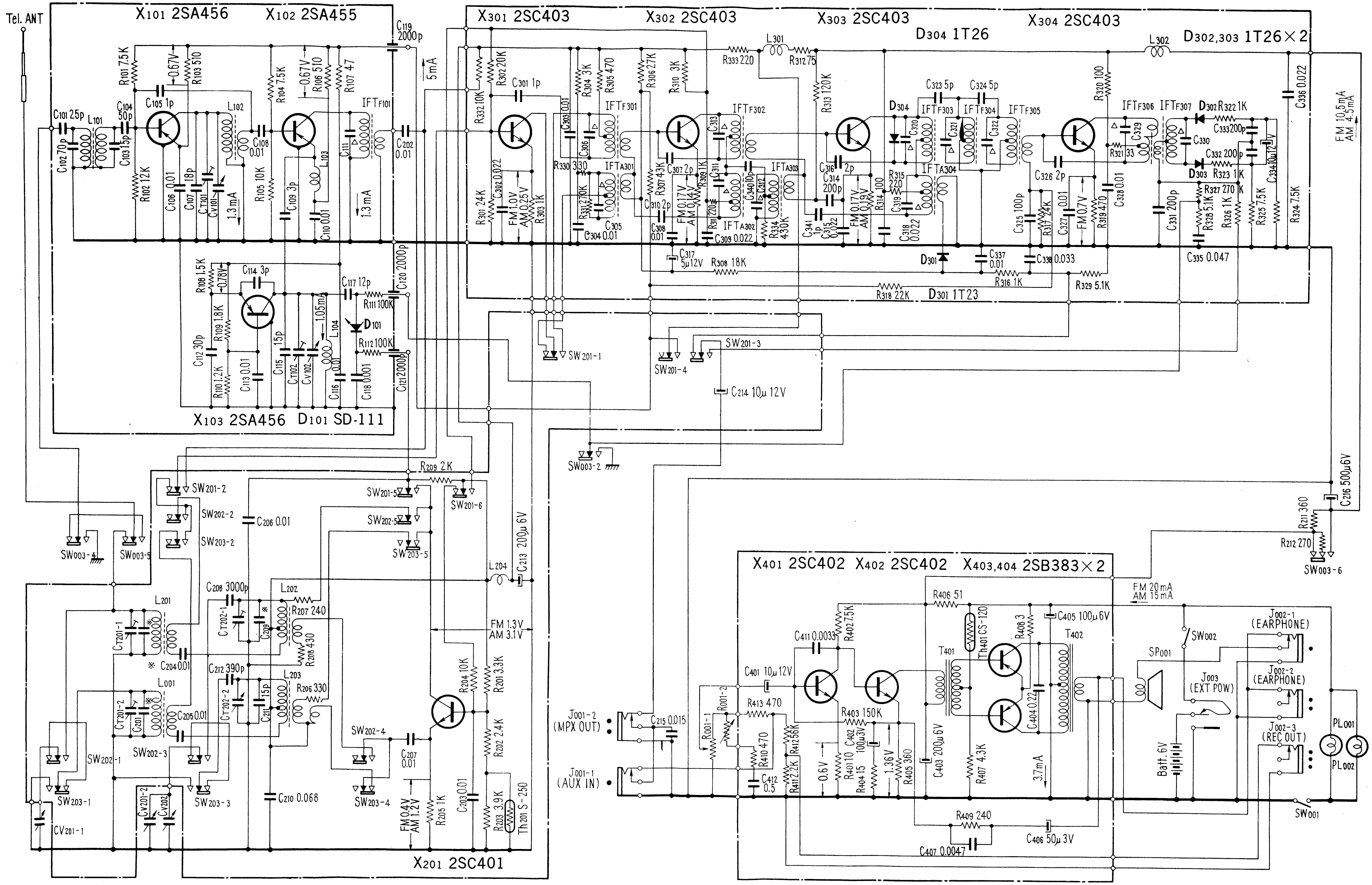
Mounting Diagram

FM Tuner Section

— Printed Side —



Schematic Diagram


Tel. ANT
X101 2SA456
X102 2SA455
X103 2SA456
D101 SD-111
X301 2SC403
X302 2SC403
X303 2SC403
X304 2SC403
D304 1T26
D302,303 1T26×2
D301 1T23
X201 2SC401
X401 2SC402
X402 2SC402
X403,404 2SB383×2
FM 10.5mA
AM 4.5mA
FM 20mA
AM 15mA
FM 1.3V
AM 3.1V
J001-2 (MPX OUT)
J001-1 (AUX IN)
J002-1 (EARPHONE)
J002-2 (EARPHONE)
J002-3 (REC OUT)
J003 (EXT POW)
SP001
Batt. 6V
SW001
SW002
PL001
PL002

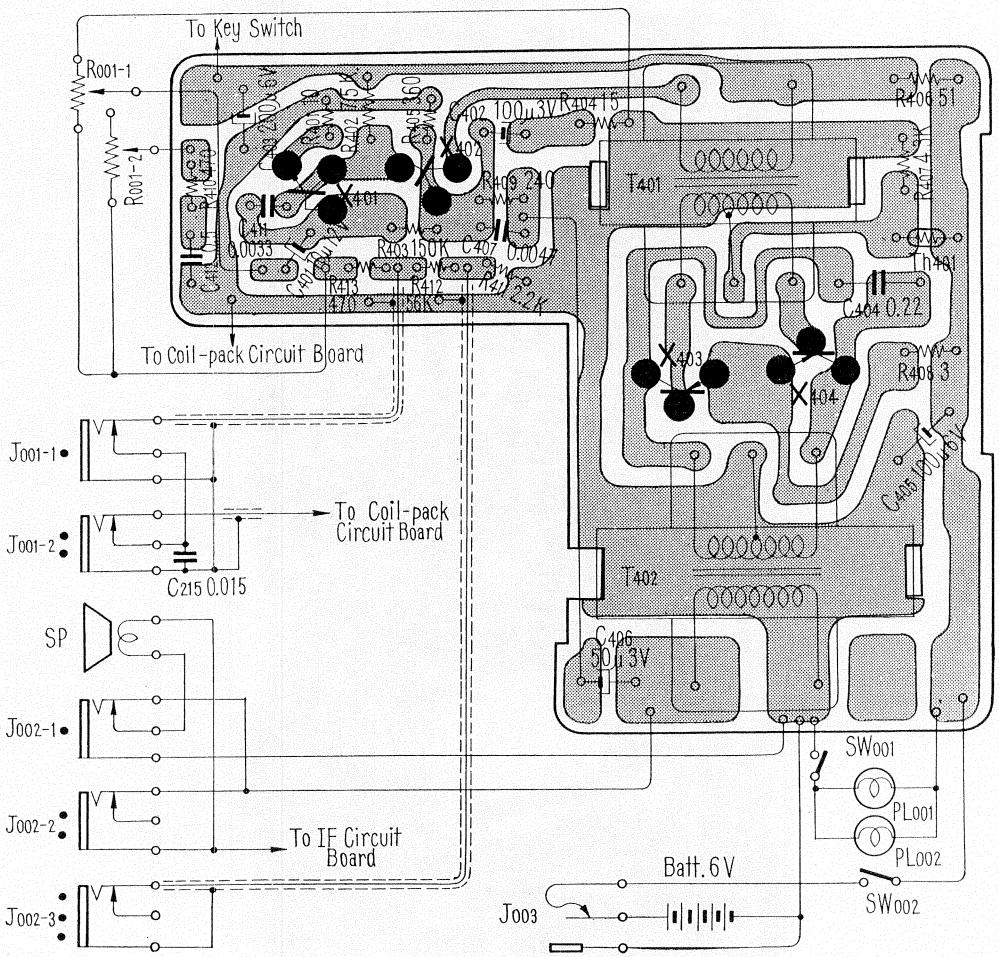
※ To be adjusted

Capacitors marked with △ are built in relative IF Transformers.

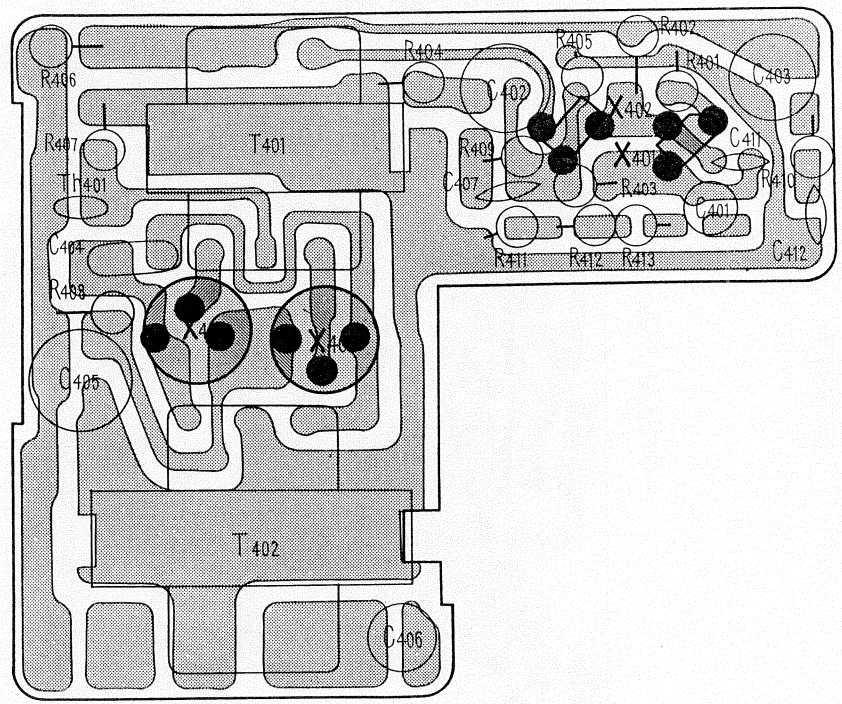
Mounting Diagram

AF Section

— Printed Side —



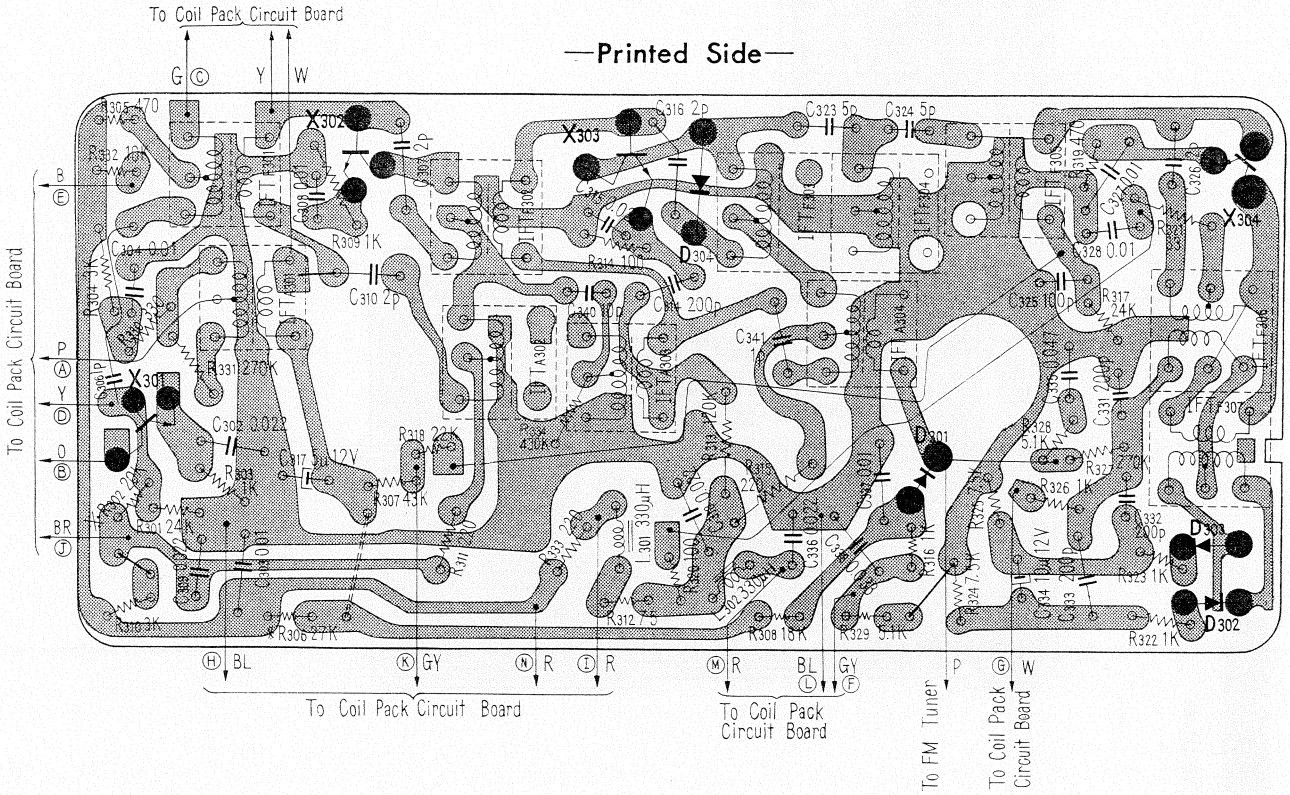
— Parts Side —



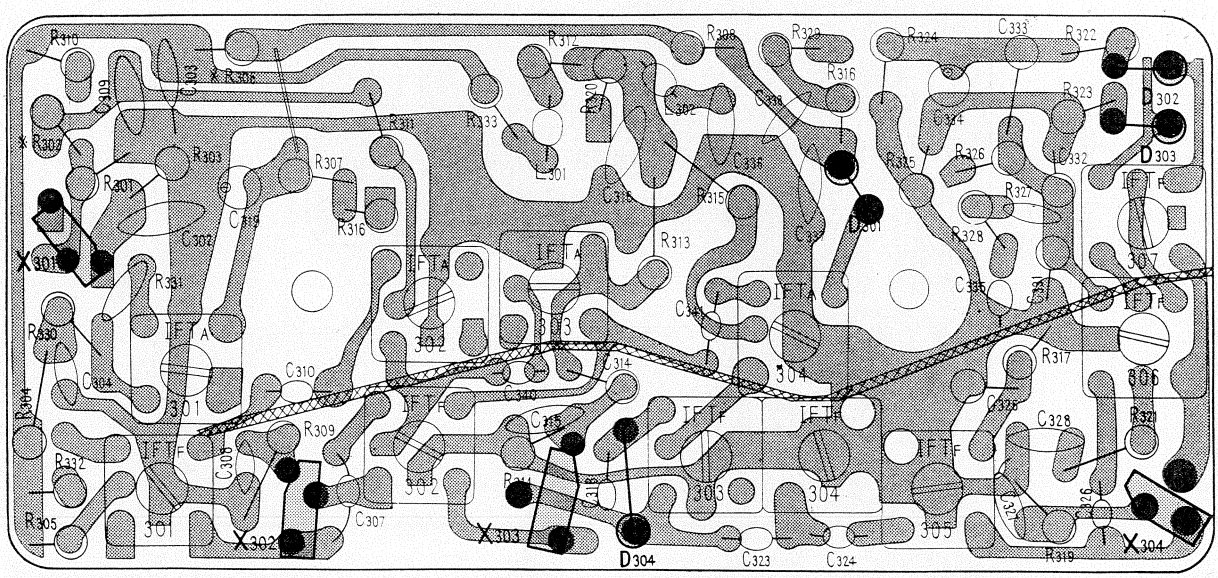
Mounting Diagram

IF Section

—Printed Side—



—Parts Side—



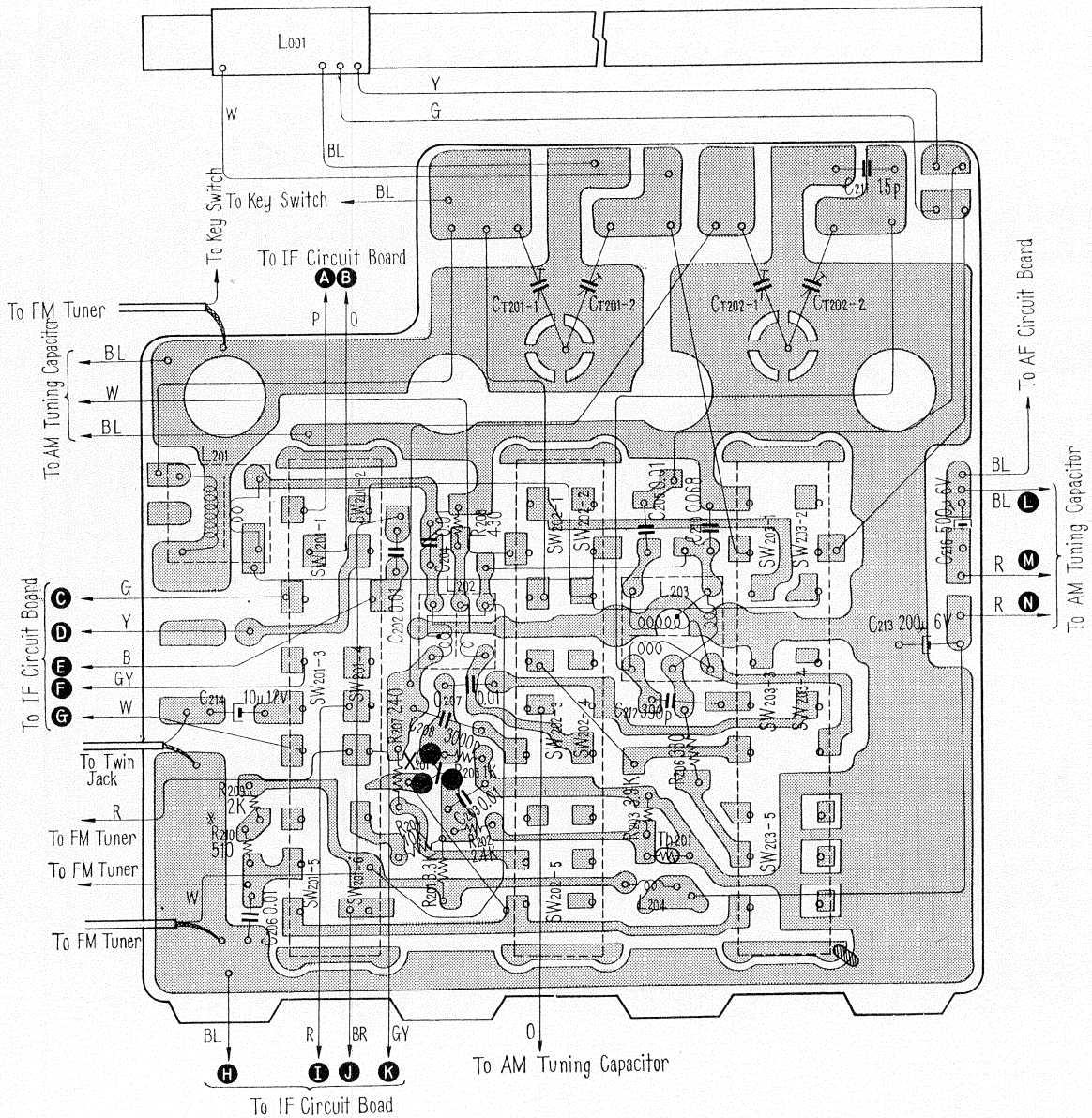
※ To be adjusted

R334, Mounted on printed side.

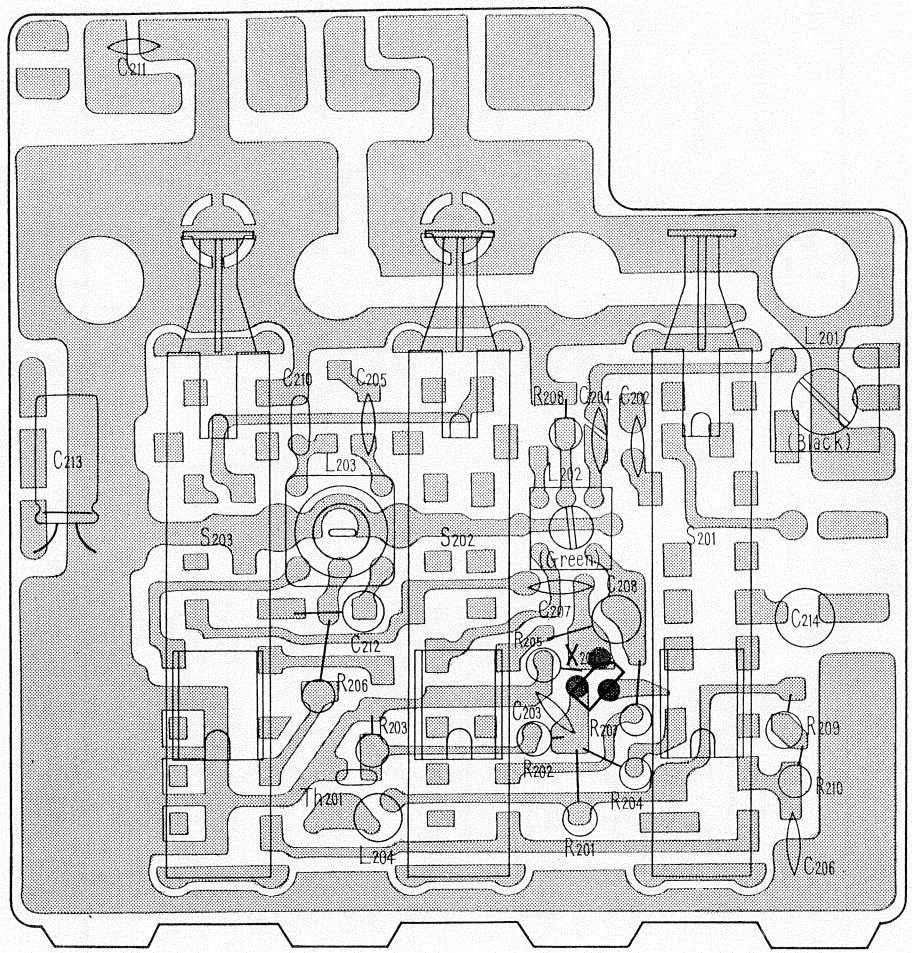
Mounting Diagram

Coil Pack Section

—Printed Side—



—Parts Side—



Electrical Parts List

Part No.	Symbol	Description
1-501-037-12	Tel. ANT	Antenna, telescopic
1-401-216-11	L_{101}	Filter, FM band pass
1-425-162-11	L_{102}	Coil, FM RF
1-405-282-11	L_{103}	Coil, FM OSC injection
-135-11	L_{104}	Coil, FM oscillator
1-401-182-12	L_{001}	Antenna, MW ferrite bar
-257-11	L_{201}	Coil, SW antenna
1-405-121-11	L_{202}	Coil, SW oscillator
-110-15	L_{203}	Coil, MW oscillator
1-407-050-11	L_{204}	Inductor, micro, 330μH
-050-11	L_{301}	Inductor, micro, 330μH
-050-11	L_{302}	Inductor, micro, 330μH
1-403-231-15	$IFTF_{101}$	Transformer, FM single tuned IF
-243-15	$IFTF_{301}$	// //
-244-15	$IFTF_{302}$	// //
-244-15	$IFTF_{303}$	// //
-244-15	$IFTF_{304}$	// //
-244-15	$IFTF_{305}$	// //
-272-15	$IFTF_{306}$	FM Discriminator (Primary)
-273-15	$IFTF_{307}$	FM Discriminator (Secondary)
-026-15	$IFTA_{301}$	Transformer, AM single tuned IF
-110-15	$IFTA_{302}$	// //
-026-15	$IFTA_{303}$	// //
-110-15	$IFTA_{304}$	// //
1-423-064-11	T_{401}	Transformer, driver
1-427-116-11	T_{402}	Transformer, output
1-514-047-11	SW_{001}	Switch, dial Light
-047-11	SW_{002}	Switch, ON-OFF
-239-11	SW_{003}	Switch, key
1-513-239-11	SW_{201}	Switch, slide
-239-11	SW_{202}	Switch, slide
-239-11	SW_{203}	Switch, slide
1-507-075-11	J_{001-1}	Jack, auxiliary input
	J_{001-2}	Jack, multiplex
-099-13	J_{002-1}	Jack, earphone
	J_{002-2}	//
	J_{002-3}	Jack, record output
-126-11	J_{003}	Jack, external power input
1-518-006-04	PL_{001}	Lamp, dial
-006-05	PL_{002}	//
1-502-098-11	SP_{001}	Speaker
1-528-002-00	Batt.	Battery, 6V in total
3-851-002-01	S_{101}	Case, FM tuner shield
X-38173-03-4	S_{301}	Case, IF shield
3-822-622-02	S_{401}	Case, AF shield
	X_{101}	Transistor 2SA456
	X_{102}	// 2SA455
	X_{103}	// 2SA456
	X_{201}	// 2SC401
	X_{301}	// 2SC403
	X_{302}	// 2SC403
	X_{303}	// 2SC403
	X_{304}	// 2SC403
	X_{401}	// 2SC402
	X_{402}	// 2SC402
	X_{403}	// 2SB383
	X_{404}	// 2SB383
	D_{101}	Diode SD-111
	D_{301}	// 1T23
	D_{302}	// 1T26
	D_{303}	// 1T26
	D_{304}	// 1T26
	Th_{201}	Thermistor S-250

Part No.	Symbol	Description
	Th_{401}	Thermistor CS-120
		Resistor
1-221-136-11	R_{001-1}	5KΩ, volume control
	R_{001-2}	5KΩ, tone control
1-208-054-11	R_{101}	7.5KΩ 1/10W ceramic
-059-11	R_{102}	12KΩ // //
-026-11	R_{103}	510Ω // //
-054-11	R_{104}	7.5KΩ // //
-057-11	R_{105}	10KΩ // //
-026-11	R_{106}	510Ω // //
-105-11	R_{107}	47Ω // //
-037-11	R_{108}	1.5KΩ // //
-039-11	R_{109}	1.8KΩ // //
-035-11	R_{110}	1.2KΩ // //
1-201-868-11	R_{111}	100KΩ 1/8W composition
1-208-145-11	R_{112}	100KΩ 1/10W ceramic
1-244-485-11	R_{201}	3.3KΩ 1/8W carbon
-482-11	R_{202}	2.4KΩ // //
-487-11	R_{203}	3.9KΩ // //
-497-11	R_{204}	10KΩ // //
-473-11	R_{205}	1KΩ // //
-461-11	R_{206}	330Ω // //
-458-11	R_{207}	240Ω // //
-464-11	R_{208}	430Ω // //
-480-11	R_{209}	2KΩ // //
-466-11	*R_{210}	510Ω // //
-462-11	R_{211}	360Ω // //
-459-11	R_{212}	270Ω // //
1-240-506-11	R_{301}	24KΩ // //
-507-11	*R_{302}	27KΩ // //
-473-11	R_{303}	1KΩ // //
-484-11	R_{304}	3KΩ // //
-465-11	R_{305}	470Ω // //
-507-11	*R_{306}	27KΩ // //
-512-11	R_{307}	43KΩ // //
-503-11	R_{308}	18KΩ // //
-473-11	R_{309}	1KΩ // //
-484-11	R_{310}	3KΩ // //
-457-11	R_{311}	220Ω // //
-446-11	R_{312}	75Ω // //
-523-11	R_{313}	120KΩ // //
-449-11	R_{314}	100Ω // //
-457-11	R_{315}	220Ω // //
-473-11	R_{316}	1KΩ // //
-506-11	R_{317}	24KΩ // //
-505-11	R_{318}	22KΩ // //
-465-11	R_{319}	470Ω // //
-449-11	R_{320}	100Ω // //
-437-11	R_{321}	33Ω // //
-473-11	R_{322}	1KΩ // //
-473-11	R_{323}	1KΩ // //
-494-11	R_{324}	7.5KΩ // //
-494-11	R_{325}	7.5KΩ // //
-473-11	R_{326}	1KΩ // //
1-208-091-11	R_{327}	270KΩ 1/10W ceramic
1-240-490-11	R_{328}	5.1KΩ 1/8W carbon
-490-11	R_{329}	5.1KΩ // //
-461-11	R_{330}	330Ω // //
1-208-091-11	R_{331}	270KΩ 1/10W ceramic
1-240-497-11	R_{332}	10KΩ 1/8W carbon
-457-11	R_{333}	220Ω // //
1-208-096-11	R_{334}	430KΩ 1/10W ceramic
1-244-425-11	R_{401}	10Ω 1/8W carbon

* To be adjusted

—continued—

Part No.	Symbol	Description
1-244-494-11	R_{402}	7.5KΩ 1/8W carbon
-525-11	R_{403}	150KΩ // //
-429-11	R_{404}	15Ω // //
-462-11	R_{405}	360Ω // //
-442-11	R_{406}	51Ω // //
-488-11	R_{407}	4.3KΩ // //
-412-11	R_{408}	3Ω // //
-458-11	R_{409}	240Ω // //
-465-11	R_{410}	470Ω // //
-481-11	R_{411}	2.2KΩ // //
-515-11	R_{412}	56KΩ // //
-465-11	R_{413}	470Ω // //
		Capacitor
1-151-088-12	$C_{V101,102}$ / $C_{T101,102}$	tuning, 2 gang / trimmer, 2 unit
1-101-090-11	C_{101}	25pF ceramic
-319-11	C_{102}	70pF //
-861-11	C_{103}	15pF //
-028-11	C_{104}	50pF //
-951-11	C_{105}	1pF //
-141-11	C_{106}	0.01μF //
-862-11	C_{107}	18pF //
-141-11	C_{108}	0.01μF //
-953-11	C_{109}	3pF //
-141-11	C_{110}	0.01μF //
	C_{111}	(Built in IFT_{F101})
1-101-871-11	C_{112}	30pF ceramic
-141-11	C_{113}	0.01μF //
-953-11	C_{114}	3pF //
-861-11	C_{115}	15pF //
-141-11	C_{116}	0.01μF //
-961-11	C_{117}	12pF //
1-105-821-12	C_{118}	0.001μF mylar
1-101-790-11	C_{119}	2000pF feed through
-790-11	C_{120}	2000pF //
-790-11	C_{121}	2000pF //
1-151-135-11	$C_{V201-1\sim2}$	tuning, 2 gang
1-141-011-00	$C_{T201-1\sim2}$	trimmer, 2 unit
-011-00	$C_{T202-1\sim2}$	// //
	C_{201}	—deleted—
1-105-411-12	C_{202}	0.01μF mylar
-411-12	C_{203}	0.01μF //
-411-12	C_{204}	0.01μF //
-411-12	C_{205}	0.01μF //
-411-12	C_{206}	0.01μF //
-411-12	C_{207}	0.01μF //
1-103-636-11	C_{208}	3000pF styrol
	C_{209}	—deleted—
1-105-416-12	C_{210}	0.068μF mylar
1-101-899-11	C_{211}	15pF ceramic
1-103-615-11	C_{212}	390pF styrol
1-121-295-11	C_{213}	200μF 6V electrolytic
-282-11	C_{214}	10μF 12V //
1-105-412-12	C_{215}	0.015μF mylar

Part No.	Symbol	Description
1-121-359-11	C_{216}	500μF 6V electrolytic
1-101-951-11	C_{301}	1pF ceramic
1-105-413-12	C_{302}	0.022μF mylar
-411-12	C_{303}	0.01μF //
-411-12	C_{304}	0.01μF //
	C_{305}	(Built in IFT_{A301})
	C_{306}	(Built in IFT_{F301})
1-101-952-11	C_{307}	2pF ceramic
1-105-411-12	C_{308}	0.01μF mylar
-413-12	C_{309}	0.022μF //
1-101-952-11	C_{310}	2pF ceramic
	C_{311}	(Built in IFT_{A302})
	C_{312}	(Built in IFT_{A303})
	C_{313}	(Built in IFT_{F302})
1-103-608-11	C_{314}	200pF styrol
1-105-413-12	C_{315}	0.022μF mylar
1-101-952-11	C_{316}	2pF ceramic
1-121-280-11	C_{317}	5μF 12V electrolytic
1-105-413-12	C_{318}	0.022μF mylar
	C_{319}	(Built in IFT_{A304})
	C_{320}	(Built in IFT_{F303})
	C_{321}	(Built in IFT_{F304})
	C_{322}	(Built in IFT_{F305})
1-101-955-11	C_{323}	5pF ceramic
-955-11	C_{324}	5pF //
1-103-601-11	C_{325}	100pF styrol
1-101-952-11	C_{326}	2pF ceramic
1-105-411-12	C_{327}	0.01μF mylar
-411-12	C_{328}	0.01μF //
	C_{329}	(Built in IFT_{F306})
	C_{330}	(Built in IFT_{F307})
1-103-608-11	C_{331}	200pF styrol
-608-11	C_{332}	200pF //
-608-11	C_{333}	200pF //
1-121-282-11	C_{334}	10μF 12V electrolytic
1-127-047-11	C_{335}	0.047μF //
1-105-413-12	C_{336}	0.022μF mylar
1-105-411-12	C_{337}	0.01μF //
-414-12	C_{338}	0.033μF //
	C_{339}	—deleted—
1-101-959-11	C_{340}	10pF ceramic
-951-11	C_{341}	1pF //
1-121-282-11	C_{101}	10μF 12V electrolytic
-290-11	C_{402}	100μF 3V //
-295-11	C_{403}	200μF 6V //
1-105-419-12	C_{404}	0.22μF mylar
1-121-291-11	C_{405}	100μF 6V electrolytic
-287-11	C_{406}	50μF 3V //
1-105-829-12	C_{407}	0.0047μF mylar
	C_{408}	—deleted—
	C_{409}	—deleted—
	C_{410}	—deleted—
1-105-827-12	C_{411}	0.0033μF mylar
1-127-022-11	C_{412}	0.5μF 10V electrolytic

Frequency Coverage and Tracking Adjustment

Frequency Coverage Adjustment

(1) Deliver a 520 Kc signal from the SSG.

(2) Set the Tuning Capacitor at the maximum capacitance position by turning the Tuning Knob of the Receiver counter-clockwise.

(3) Adjust the core of the MW OSC Coil (L_{203}) to tune to the signal.

(4) Set the Tuning Capacitor at the minimum capacitance position by turning the Tuning Knob of the Receiver clockwise.

(5) Deliver a 1,680 Kc signal from the SSG.

(6) Adjust the MW OSC Trimmer Capacitor (CT_{202-2}) to tune to the signal.

(7) Repeat the above procedures (1～6) until the frequency range between 520 Kc and 1,680 Kc is fully covered.

Tracking Adjustment

(1) Deliver a 620 Kc signal from the SSG.

(2) Tune to the signal by turning the Tuning Knob of the Receiver.

(3) Adjust the position of the MW ANT Coil (L_{001}) along the Ferrite Bar to obtain the maximum output.

(4) Deliver a 1,400 Kc signal from the SSG.

(5) Tune to the signal by turning the Tuning Knob of the Receiver.

(6) Adjust the MW ANT Trimmer Capacitor (CT_{201-2}) to obtain the maximum output.

(7) Repeat the above procedures (1～6) until the maximum output is obtained.

SW Band

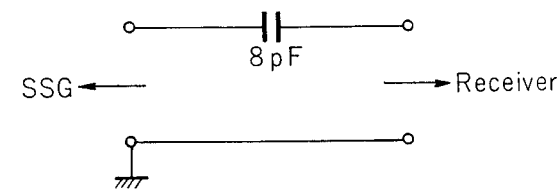
Preparation for Adjustments

☆ Receiver to be adjusted

Band Switch setting : SW

☆ Antenna : Use a Dummy Antenna.

Unsolder lead at telescopic antenna terminal and connect SSG to telescopic antenna lead and ground of receiver through Dummy Antenna as shown in Fig. 6.



(Fig. 6)

☆ Other preparations are same with that of MW adjustment.

Frequency Coverage Adjustment

(1) Deliver a 3.8 Mc signal from the SSG.

(2) Set the Tuning Capacitor at the maximum capacitance position by turning the Tuning Knob of the Receiver counter-clockwise.

(3) Adjust the core of the SW OSC Coil (L_{202}) to tune to the signal.

(4) Set the Tuning Capacitor at the minimum capacitance position by turning the Tuning Knob of the Receiver clockwise.

(5) Deliver a 12.6 Mc signal from the SSG.

(6) Adjust the SW OSC Trimmer Capacitor (CT_{202-1}) to tune to the signal.

(7) Repeat the above procedures (1～6) until the frequency range between 3.8 Mc and 12.6 Mc is fully covered.

Tracking Adjustment

(1) Deliver a 3.8 Mc signal from the SSG.

(2) Tune to the signal by turning the Tuning Knob of the Receiver.

(3) Adjust the core of the SW ANT Coil (L_{201}) to obtain the maximum output.

(4) Deliver a 12.6 Mc signal from the SSG.

(5) Tune to the signal by turning the Tuning Knob of the Receiver.

(6) Adjust the SW ANT Trimmer Capacitor (CT_{201-1}) to obtain the maximum output.

(7) Repeat the above procedures (1～6) until the maximum output is obtained.

FM Band

Preparation for Adjustments

☆ Receiver to be adjusted

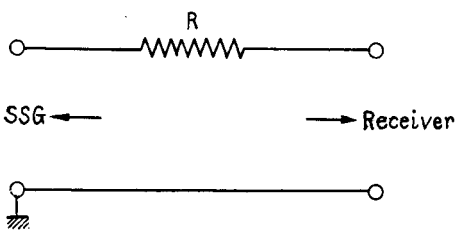
Power Source Voltage :	Keep 6 Volts during the adjustments.
Band Switch setting :	FM
Volume Control setting :	Maximum
Tone Switch setting :	HIGH
AFC Switch setting :	OFF

☆ Load for Output : Connect an 8Ω resistor instead of speaker.

☆ Output Meter : Connect across the load resistor 8Ω.
(VTVM can be used also.)

☆ Signal Source : Use a SSG (Standard Signal Generator) which can deliver FM signals modulated at 30% with 400 c/s.

☆ Dummy Antenna : Unsolder the lead at the telescopic antenna terminal. Connect the SSG to the telescopic antenna lead and ground of the receiver through the Dummy Antenna as shown in Fig. 7.



(Fig. 7)

* Nominal input impedance of the receiver is 75Ω.

* R is then calculated as follows :

$$R = 75 - Rs \ [\Omega]$$

where Rs is output impedance of the SSG which is usually 50Ω or 75Ω.

Frequency Coverage Adjustment

(1) Deliver a 85 Mc signal from the SSG.

(2) Set the Tuning Capacitor at the maximum capacitance position by turning the Tuning Knob of the Receiver counter-clockwise.

(3) Adjust the core and gap of the FM OSC Coil (L_{104}) to tune to the signal.

(4) Deliver a 109.5 Mc signal from the SSG.

(5) Set the Tuning Capacitor at the minimum capacitance position by turning the Tuning Knob of the Receiver clockwise.

(6) Adjust the FM OSC Trimmer Capacitor (CT_{102}) to tune to the signal.

(7) Repeat the above procedures (1～6) until the frequency range between 85 Mc and 109.5 Mc is fully covered.

Tracking Adjustment

(1) Deliver a 85 Mc signal from the SSG.

(2) Tune to the signal correctly by turning the Tuning Knob of the Receiver.

(3) Adjust the FM RF Coil (L_{102}) for the maximum reading on the Output Meter.

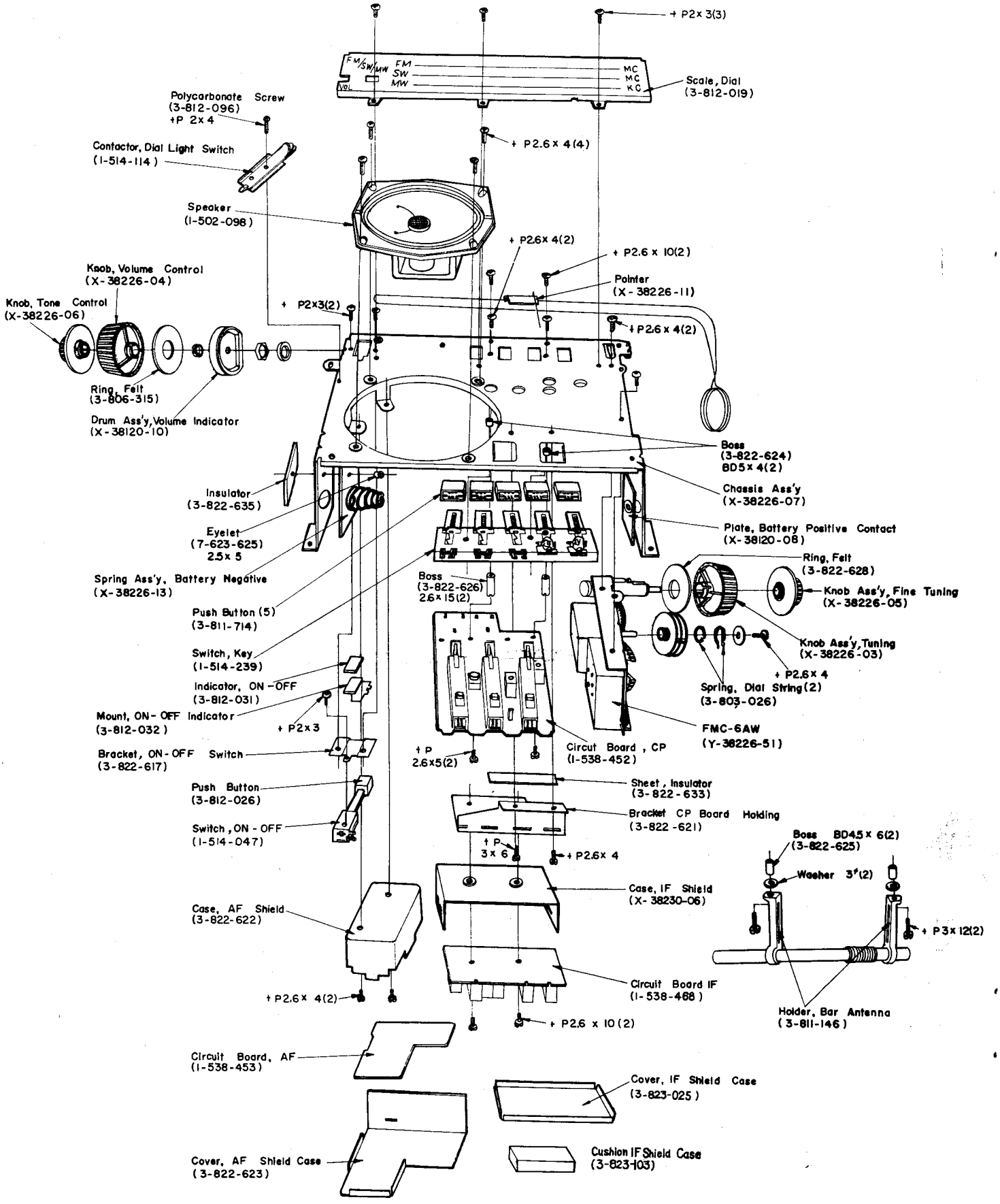
(4) Deliver a 109.5 Mc signal from the SSG.

(5) Tune to the signal correctly by turning the Tuning Knob of the Receiver.

(6) Adjust the FM RF Trimmer Capacitor (CT_{101}) to obtain the maximum output.

(7) Repeat the above procedures (1～6) until the maximum output is obtained.

Exploded Diagram



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